Southeast Strategic Regional Coastal Monitoring Programme

ANNUAL REPORT
2008

Durlston Head to Portland Bill

AR 48
30 June 2008
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008 – Durlston Head to Portland Bill

1. Introduction
Analysis presented in this interim report provides an overview of beach changes and wave and tidal measurements since the commencement of the Southeast Strategic Regional Coastal Monitoring Programme. The first beach surveys took place during the winter of 2003 and changes are reported until spring 2008. As there is now over 5 years worth of monitoring data for all profile sites, this report provides an overview of 5 yearly change using the topographic baseline data.

Data are presented at several levels:
- Process cell summary of profile change from 2007 to 2008
- Process cell summary of profile change from 2003 to 2008
- Detailed beach profile change from 2007 to 2008
- Detailed beach profile change from 2003 to 2008
- Difference model from topographic baseline surveys in 2003 and 2008
- Beach recycling events from 2003 to 2008
- Change in position of Mean High Water
- Surface sediment distribution
- Time series of beach profile graphs (on CD)
- Trend analysis of beach cross-sectional area (on CD)

The process cell summary maps provide an at-a-glance summary of the changes during the past year and over the longer term. It is recommended that the user should use the maps to identify areas of interest and then examine the individual profile plots and trends. Colour-coded lines highlight areas of maximum change and identify profiles which might need closer examination.

Difference models have been produced where there are at least two baseline surveys to compare. Where only one baseline survey exists, the data has been modelled into a Digital Terrain Model (DTM) and overlayed on the 2005 aerial photography. In addition, the topographic baseline data has been used to extract the level of Mean High Water (MHW) from each baseline data set and sediment distribution maps are produced from the latest survey information.

It must be appreciated that the accuracies of each measurement system must be taken into account when drawing conclusions, particularly from the difference models. In the case of topographic difference models from RTK GPS surveys, the accuracy of each data point is ±0.03m and therefore differences of ±0.06m can generally be considered as "real", whilst smaller changes may be an artifact of the measuring system, and are considered to be "No Change". Difference plots show changes >±0.25m, which should be indicative of areas of genuinely measurable change. Smaller changes may also be present but these are filtered from the analysis to provide clarity. This report displays difference models only where detailed analysis suggests that the changes are real but,
nevertheless, the user should approach the results as indicative, unless reinforced over time or with other information.

Beach recycling maps have been produced from information provided by the Local Authority for all applicable sites.

2. **Hydrodynamic data**
   a. **Waves**
   A directional Waverider buoy was deployed on 18 December 2006. A similar number of storms occurred from January to April 2008 as in 2007, but the wave heights at the storm peak were typically 0.5m higher this year. Storm direction for the largest events was concentrated around SSE (~160°), with one storm from SEbE (~120°). A significant tidal surge was associated with the storm on 10 March 2008, which coincided with equinoctial spring tides. The full wave report is given at Annex A.
   b. **Tides**
   A tide gauge was installed on Swanage Pier in March 2007 with kind permission of Swanage Pier Trust.

3. **Survey data – topographic**
   From Weymouth around to Worbarrow Tout most changes have been relatively minor, but with isolated pockets of erosion and deposition. The majority of units show erosion or no change at the eastern end and accretion at the western end, again contrasting with last year’s analysis. Over the longer term the most notable erosion has occurred at the western end and accretion at the eastern end of units.

   Dates of the surveys are given in Annex E and the detailed topographic survey report is given in Annex F.

4. **Survey data – bathymetric**
   The first baseline bathymetric survey of Dorset was completed in May 2003 with a repeat survey in 2006/07. Tidal control for the earlier survey, however, was particularly difficult and in some areas has led to inconsistent results when compared with later surveys. Recent surveys were conducted using GPS-derived tides which give much greater confidence in the tidal control. Where the bathymetric data is considered potentially unreliable, the difference model has been substituted by a DTM of the latest survey from 2006/7.

<table>
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<tr>
<th>Annex A</th>
<th>Weymouth Interim Wave Report</th>
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<td>Annex E</td>
<td>High Level Report – field data collection (SCOPAC)</td>
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<td><strong>Explanatory Notes</strong></td>
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Weymouth Directional Waverider Buoy

Location
OS: 371646E 81037N
WGS84: Latitude: 50°37.699'N Longitude: 002°24.133'W

Water Depth
10.6m CD

Instrument Type
Datawell Directional WaveRider Buoy Mk III

Data Quality

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Tables and plots of these values, together with the minimum and maximum values and the standard deviation are available on the website.

Highest storm events in 2007/8

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<th>Hs</th>
<th>Tp</th>
<th>Tz</th>
<th>Dir.</th>
<th>Water level elevation (OD)</th>
<th>Tidal stage (hours re. HW)</th>
<th>Tidal range (m)</th>
<th>Tidal surge* (m)</th>
<th>Max. surge* (m)</th>
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* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Weymouth). The surge shown is the residual at the time of the highest Hs. The maximum tidal surge is the largest positive surge during the storm event.
Distribution plots

The distribution of wave parameters is shown in the accompanying graphs of:
- Wave rose (Direction vs. $H_s$) for reporting year and for all measured data
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction from June 2007 to May 2008
- Monthly time series of significant wave height (the red line is the storm threshold)
- Incidence of storms during the reporting period and all previous years. Storms are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm is shown.

Summary

A similar number of storms occurred from January to April 2008 as in 2007, but the wave heights at the storm peak were typically 0.5m higher this year. Storm direction for the largest events was concentrated around SSE (~160°), with one storm from SEbE (~120°). A significant tidal surge was associated with the storm on 10 March 2008, which coincided with equinoctial spring tides.

Acknowledgements

Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.
Direction vs. $H_s$ for June 2007 to May 2008 (this reporting year)

Direction vs. $H_s$ for December 2006 to May 2008 (all measured data)
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<th>Sub-cell</th>
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<th>Profile 1</th>
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Key:
- Completed on time
- Surveyed, but data not submitted
- Completed late
- Not required

Notes:
1. Variable baseline survey completion dates due to better tidal conditions
2. Profile sequence delayed to match previous year's survey
3. Area difficult to survey - covered by annual lidar
4. Area dangerous to survey (loose boulders, seaweed strewn), covered by annual lidar
5. Added to survey programme 2007
6. Access only during summer
7. Delayed due to bad weather
8. Baseline survey brought forward due to beach operational reasons
Annex F – Topographic Survey Report for Dorset

1. Introduction
Analysis has been conducted for those sites where a minimum of four surveys have been recorded. In general, changes are measured relative to the Mean Low Water Springs level, although this has not been possible for much of the historic data at many of the sites. Where possible, longer-term records from earlier programmes are also presented in the profile analysis, although historical data was often collected using significantly different survey techniques, specifications and even datums. Continuity of record has been attempted but is not always possible.

A full time series of plotted beach profiles are shown superimposed and relative to a Master Profile for each profile location (on the accompanying CD). The Master Profile provides the basis for calculation of beach cross-section area changes. Where possible, identical depth boundaries have been used for all profiles within a Management Unit. However, even where this has not been possible, direct comparisons can be made for the beach cross sectional area at one profile over time, since the master profile is constant for each profile (Figure 1). In some instances, raising the lower depth of the Master Profile may reduce the overall cross sectional area of the profile. This may cause small changes in the beach profile to have a large impact on the percentage change. This effect has been taken into account in the analysis of change to beach profiles. The trend in cross-sectional area (CSA) is presented as a graph for each profile (Figure 2).

Figure 1: Example Master Profile with CSA calculated from the surveyed GPS profile
As part of the monitoring programme specification, each management unit receives a full topographic baseline survey once every 5 years, with the exception of BMP sites which receive an annual baseline. Baseline surveys include a full profile survey at 50m intervals and continuous spot height data collected at approximately 1m intervals across the whole beach to the level of MLWS. This continuous data also includes a feature code for each spot height data point recorded. Where possible the feature code data has been used to provide a sediment distribution map for each management unit.

Where there are at least two baseline surveys for each management unit a topographic difference model has been produced based on the spot height elevations. The raw spot height data has been processed into a grid model and successive models have been subtracted from one another to produce a difference model for the management unit. This spot height data from each survey has also been used to approximate the level of MHW (Mean High Water) along each management unit to highlight change.
For the bathymetric data, where only one survey exists of a particular area, no analysis is possible and the data is presented as a DTM. In some cases, previous survey data may have been collected using different survey techniques or specifications and thus direct comparison with the latest survey is difficult. Under these circumstances only the latest survey is presented and no difference model is included.

The bathymetric data is now collected using an RTK tide correction to give real time tidal corrections for the data, rather than measured tides. Some previous data (from approximately pre-2005) may have a tidal correction derived from another source which is now considered to be unreliable to give sufficient accuracy for direct survey comparison in most cases. It should be noted that the accuracy associated with bathymetric data collection is approximately ±0.5m at best. Therefore differences of <1m should be treated as illustrative, particularly over rocky substrate.

2. Condition of process sub-cell
The Beach Change Summary map contains an at-a-glance condition of the whole of the Durlston Head to Portland Bill area, with the lines representing the percentage of accretion, no change or erosion within each Management Unit for which there is topographic data.

3. Condition of individual Management Units
Changes within each Management Unit are summarised on seven maps: Beach change map (Spring to Spring), beach change map (Baseline to Spring), topographic difference model maps, beach recycling maps (where applicable), MHW line maps, surface sediment distribution maps and bathymetric DTMs.

Beach Change maps show the location of each beach profile, superimposed on 2005 aerial photography (note that the line may have been extended for clarity). Where possible, the annual change in cross-sectional area has been calculated from spring 2007 to spring 2008 and from baseline 2003/04 to spring 2008.

In CPU5c, 5b and 5a, alternate profiles were analysed, since these profiles have a spacing of 200m as specified in the Regional Monitoring Programme. As with last year, spring to spring analysis was conducted to the Mean Low Water Spring level of -0.83mOD while baseline (2003) to Spring uses a level of 0mOD. It is also worth noting that following storms in March, sediment was moved from the foreshore to the crest in CPU5b & 5c, as shown on the CSA graphs and the beach nourishment and extraction plots; consequently change in this area is not necessarily natural.
**CPU10d: Arish Mell (East) to Worbarrow Tout**  
**Spring 2007 to Spring 2008**  
This unit generally shows little change over the year. As it was not possible to measure the most westerly interim profile last year, the closest profile that was measured has been used for comparison here and this shows some recovery.

**Baseline Spring 2003 to Spring 2008**  
A long term trend of erosion to the west and accretion to the east can be seen.

**Topographic Difference Model, 2003 to 2007**  
This model illustrates the long term trend of sediment movement from west to east of the bay. The differences appear to be greatest towards the back of the beach.

**Mean High Water Position, 2003 to 2007**  
The position has retreated by up 14m at the area of greatest erosion while towards the east, at the area of greatest increase in sediment, the position has moved seaward by approximately 7m with no change at the sheltered eastern end of the bay.

*Net Sediment Balance above MLWS from 2003 to 2007:  +11,820 m³*

*N.B. This figure is particularly high as the area of greatest erosion could not be surveyed in 2007, due to it being unsafe to walk over the exposed rocks, and therefore a large area of net erosion is missing from the net sediment balance. In order to provide a better long term assessment of net sediment change, the 2003 baseline data was also compared to the 2008 lidar.*

**Topographic Difference Model, 2003 to 2008**  
This model uses 2008 lidar data to show increased coverage of the western end of the beach which helps explains where the sediment increase may have come from,

*Net Sediment Balance above MLWS from 2003 to 2008:  +3,463 m³*

**CPU8b: Lulworth Cove**  
**Spring 2007 to Spring 2008**  
This analysis shows Lulworth Cove to have been very stable, with no significant change over the year.

**Baseline Spring 2003 to Spring 2008**  
Over the longer-term all profiles show some minor erosion.

**Topographic Difference Model, 2003 to 2007**  
There has been little change in overall elevation here, however some minor changes have occurred at the back of the beach with material apparently moving away from the base of the cliff.

**Mean High Water Position, 2003 to 2007**  
As expected, there is very little difference to the position of this.

*Net Sediment Balance above MLWS from 2003 to 2007:  +1,055 m³*
CPU7c: Man O’War Rocks to Stair House  
**Spring 2007 to Spring 2008**
Contrasting again with the previous year’s report, this appears to show accretion to the west and erosion to the east, although the changes are less dramatic. Interestingly, the beach volumes measured this year are almost identical to those measured in 2005 for both profiles.

**Baseline Spring 2003 to Spring 2008**
The opposite trend is observed over the longer term.

**Topographic Difference Model, 2003 to 2007**
Unfortunately the coverage of the 2003 baseline survey was somewhat limited but for the areas that can be compared, a long term trend of movement from west to east is shown, even though on an annual basis occasionally the trend may be reversed.

**Mean High Water Position, 2003 to 2007**
The position of the MHW mark for 2003 is only shown at the eastern end where it shows little change in 2007.

*Net Sediment Balance above MLWS from 2003 to 2007: +631m³*

CPU7b: Bats Head to Man O’War rocks  
**Spring 2007 to Spring 2008**
Also contrasting with the previous year, the analysis shows slight accretion to the west. Minor erosion to the east is also apparent.

**Baseline Spring 2003 to Spring 2008**
As the recovery to the western profile is small, the overall trend of erosion continues to be greatest at this end.

**Topographic Difference Model, 2003 to 2007**
The model is very useful in illustrating the area of deposition just to the west of Durdle Door, which is not picked up by the interim line surveys. Thus rather than an overall trend of erosion, a long term movement of sediment from west to east appears to be occurring. In the small bay to the east of Durdle Door, the interim line is well positioned to pick up the area showing slight erosion, however there is no change in elevation for most of the remainder of this bay.

**Mean High Water Position, 2003 to 2007**
The position has moved landward by up to 10m at the western end of the unit and seaward by up to 15m towards Durdle Door. The position has moved seaward for the whole of the adjacent small bay.

*Net Sediment Balance above MLWS from 2003 to 2007: +5,014m³*

CPU6g: Ringstead Bay (west) to White Nothe  
**Spring 2007 to Spring 2008**
This unit shows stability over the year with only slight erosion to the west.
Baseline Spring 2003 to Spring 2008
A similar pattern of erosion at the western end of the unit and accretion to the east is observed over the longer period.

Topographic Difference Model, 2003 to 2007
This model again illustrates the long term movement of sediment from west to east with the majority of deposition across the central section being on the foreshore.

Mean High Water Position, 2003 to 2007
This has moved by 7-8m towards the land at the western end & towards the sea at the eastern end.

Net Sediment Balance above MLWS from 2003 to 2007:  -606m³

CPU6f: Ringstead to Ringstead Bay (west)
Spring 2007 to Spring 2008
The profiles here show this management unit to be stable. The offshore reefs offer considerable protection at this site.

Baseline Spring 2004 to Spring 2008
Over the longer term, stability can be seen for the two profile lines where adequate 2004 data is available to make a comparison.

Topographic Difference Model, 2005 to 2007
The majority of erosion has taken place in the central section at the back of the beach but a trend of accretion to the east can be seen although the foreshore appears to have slightly eroded adjacent to the rock groyne. A ridge of deposition can also be seen through the central section.

Mean High Water Position, 2005 to 2007
The position has not changed a great deal, most notably it has moved seaward by up to 3m towards the eastern end.

Net Sediment Balance above MLWS from 2005 to 2007:  +607m³

CPU5c: Overcombe to Bowleaze Cove (west)
Spring 2007 to Spring 2008
Although the majority of this unit is stable, the westerly end (adjacent to Preston Beach) has incurred some erosion.

Baseline Spring 2003 to Spring 2008
Over the longer period, there has been significant accretion across the unit with the exception of the most westerly profile which again shows slight erosion.

Topographic Difference Model, 2005 to 2008
This illustrates that the central area has shown most accretion. It can be seen that the erosion of the most westerly profile has occurred at the back of the beach.
Mean High Water Position, 2005 to 2008
In the section of greatest accretion, the mean high water position has moved seaward by up to 7m.

Net Sediment Balance above MLWS from 2005 to 2008:  +9,416m³

CPU5b: Preston Beach Groyne to Overcombe
Spring 2007 to Spring 2008
Preston Beach has shown only minor changes although in contrast to last year, there has been some slight erosion at the eastern end of the unit, adjacent to Bowleaze Cove.

Baseline Spring 2003 to Spring 2008
A broadly similar pattern is observed over the longer period including the area of some erosion at the eastern end of the unit & with the addition of erosion at Profile 5g00306.

Topographic Difference Model, 2005 to 2008
The difference model shows the majority of the unit to have experienced little change.

Mean High Water Position, 2005 to 2008
As would be expected, this has not moved much.

Net Sediment Balance above MLWS from 2005 to 2008:  -5,727m³

CPU5a: Commercial Pier to Preston Beach Groyne
Spring 2007 to Spring 2008
Most profiles show very little change with minor erosion across the central section.

Baseline Spring 2003 to Spring 2008
Overall the majority of this management unit has been stable or accreting over the longer term, apart from the central section where erosion has occurred.

Topographic Difference Model, 2005 to 2008
The model shows that most change has occurred at the western end with erosion taking place on the lower beach & deposition at the back. A pocket of accretion can be seen adjacent to the rock groyne.

Mean High Water Position, 2005 to 2008
Overall this has moved very little.

Net Sediment Balance above MLWS from 2005 to 2008:  +3,052m³
Southeast Strategic Regional Coastal Monitoring Programme

Beach Change Summary - Spring 2007 to Spring 2008

Annual Report 2008

Southeast Strategic Regional Coastal Monitoring Programme

Beach Change Summary - Spring 2007 to Spring 2008

Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

Accretion
- > 30 %
- 15 - 30 %
- 5 - 15 %
- 5 - 15 %
- 15 - 30 %
- > 30 %

Erosion
- Less than 5 %
- 5 - 15 %
- 15 - 30 %
- > 30 %

MU boundary

Actual Annual Change in Cross-sectional Area (m²)

5g00212 (3)
Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

**Accretion**
- > 30%
- 15 - 30%
- 5 - 15%
- 5 - 15%
- 15 - 30%
- > 30%

**Erosion**
- Less than 5%
- 5 - 15%
- 15 - 30%

- (2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2003 to Spring 2008)

- **Accretion**
  - >30%
  - 15 - 30%
  - 5 - 15%
  - Less than 5%

- **Erosion**
  - >30%
  - 15 - 30%
  - 5 - 15%
  - Less than 5%

**MU boundary**

Actual Annual Change in Cross-sectional Area (m²)

---

**CPU 10d - Beach Change**

**SCOPAC - Dorset**

**Annual Report 2008**

Southeast Strategic Regional Coastal Monitoring Programme

± 0 100 200 m

(2005 Aerial Photography)
Change in Elevation (m) between Feb 2003 and July 2007

Model Extent

ACCRETION No Change EROSION

0 100 200 m

(CPU 10d - Topographic Difference Model (2003 - 2007) SCOPAC - Dorset)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

Baseline Data:
Feb 2003 - Topographic Survey
March 2008 - Lidar

Southeast Strategic Regional Coastal Monitoring Programme
(2005 Aerial Photography)

Change in Elevation (m) between Feb 2003 and March 2008

ACCRETION No Change EROSION

Model Extent

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU10d - Mean High Water Position

±

Annual Report 2008

SCOPAC - Dorset

0 100 200 m

MHW Position
0.83m OD

Feb 2003
July 2007

(2005 Aerial Photography)
Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
- **Erosion**
  - Less than 5%
  - 5 - 15%
  - 15 - 30%
  - > 30%

No Change
- Less than 5%

MU boundary

Actual Annual Change in Cross-sectional Area (m²)

(2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2003 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
  - Less than 5%

- **Erosion**
  - 5 - 15%
  - 15 - 30%
  - > 30%

**No Change**
- 5 - 15%

**Actual Annual Change in Cross-sectional Area (m²)**

**MU boundary**

**5g00161 (-3)**

**5g00167 (-3)**

**5g00172 (-1)**

**5g00212 (3)**

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU 8b - Topographic Difference Model (2003 - 2007)  SCOPAC - Dorset

Change in Elevation (m) between Feb 2003 and June 2007

-3 -2 -1 0 0.25 0.5 1 1.5 2 2.5 3
ACCRETION No Change EROSION

Model Extent
CPU8b - Mean High Water Position

MHW Position
0.83m OD

Feb 2003
June 2007

(2005 Aerial Photography)
Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
  - Less than 5%
  - 5 - 15%
  - 15 - 30%
  - > 30%

- **Erosion**
  - 5 - 15%
  - 15 - 30%

**MU boundary**

**Actual Annual Change in Cross-sectional Area (m^2)**

- 5g00212 (3)

**Annual Report 2008**

**Southeast Strategic Regional Coastal Monitoring Programme**

**CPU 7c - Beach Change**

**SCOPAC - Dorset**

(2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2003 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
- **No Change**
  - Less than 5%
- **Erosion**
  - 15 - 30%
  - > 30%

MU boundary

Actual Annual Change in Cross-sectional Area (m²)

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU7c - Mean High Water Position

±

Annual Report 2008

SCOPAC - Dorset

MHW Position
0.83m OD

May 2003
July 2007

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU 7b - Topographic Difference Model (2003 - 2007)

SCOPAC - Dorset

Annual Report 2008

Change in Elevation (m) between Oct 2003 and Sept 2007

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<td>-2.5--2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3--2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= -3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model Extent

0 100 200 m

(2005 Aerial Photography)
CPU7b - Mean High Water Position

MHW Position
0.83m OD

(2005 Aerial Photography)
CPU7b - Surface Sediment Distribution

Sediment Type
- Gravel
- Gravel & Sand
- Sand
- Boulders
- Dune
- Grass
- Gravel & Mud
- Mud
- Mud & Sand
- Rock
- Saltmarsh
- Sea Defence
- Shell
- Water body
- Mixture
- Obstruction

(Baseline data from 2007) 0 100 200 m

(2005 Aerial Photography)
Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

**Accretion**
- > 30%
- 15 - 30%
- 5 - 15%

**Erosion**
- Less than 5%
- 5 - 15%
- 15 - 30%
- > 30%

**No Change**
- Actual Annual Change in Cross-sectional Area (m²)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU 6g - Topographic Difference Model (2003 - 2007)

±

E

SCOPAC - Dorset

Model Extent

Change in Elevation (m) between Aug 2003 and Sept 2007

ACCRETION No Change EROSION

CPU 6g - Topographic Difference Model (2003 - 2007)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU6g - Mean High Water Position

±E

Annual Report 2008

SCOPAC - Dorset

0 100 200

MHW Position
0.83m OD

Aug 2003
Sept 2007

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

SCOPAC - Dorset

CPU6g - Surface Sediment Distribution

Sediment Type
- Gravel
- Gravel & Sand
- Sand
- Boulders
- Dune
- Grass
- Gravel & Mud
- Mud
- Mud & Sand
- Rock
- Saltmarsh
- Sea Defence
- Shell
- Water body
- Mixture
- Obstruction

(Baseline data from 2007) (2005 Aerial Photography)
Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
  - Less than 5%
- **Erosion**
  - 15 - 30%
  - > 30%

**No Change**
- 5 - 15%

**MU boundary**

Actual Annual Change in Cross-sectional Area (m²)

(2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2004 to Spring 2008)

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>Change in Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accretion</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td></td>
<td>15 - 30 %</td>
</tr>
<tr>
<td></td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>No Change</td>
<td>Less than 5 %</td>
</tr>
<tr>
<td></td>
<td>5 - 15 %</td>
</tr>
<tr>
<td></td>
<td>15 - 30 %</td>
</tr>
<tr>
<td></td>
<td>&gt; 30 %</td>
</tr>
</tbody>
</table>

- Actual Annual Change in Cross-sectional Area (m²)

MU boundary

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU 6f - Topographic Difference Model (2005-2007)

Change in Elevation (m) between Feb 2005 and Sept 2007

-3.25 to -3.75
-3.0 to -3.25
-2.5 to -3.0
-2.0 to -2.5
-1.5 to -2.0
-1.0 to -1.5
-0.75to -1.0
-0.5 to -0.75
-0.25 to 0.0
0.0 to 0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.25
3.25 to 3.75

ACCRETION  No Change  EROSION

Model Extent
Southeast Strategic Regional Coastal Monitoring Programme

CPU6f - Mean High Water Position

Annual Report 2008

SCOPAC - Dorset

MHW Position
0.83m OD

Feb 2005
Sept 2007

(2005 Aerial Photography)
**Southeast Strategic Regional Coastal Monitoring Programme**

**Annual Report 2008**

**CPU 5c - Beach Change**

**SCOPAC - Dorset**

### Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
- **No Change**
  - Less than 5%
  - 5 - 15%
- **Erosion**
  - 15 - 30%
  - > 30%

**Actual Annual Change in Cross-sectional Area (m²)**

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%
- **Erosion**
  - 15 - 30%
  - > 30%

(2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2003 to Spring 2008)

Accretion
- > 30%
- 15 - 30%
- 5 - 15%
- Less than 5%
No Change
- 5 - 15%
- 15 - 30%
- > 30%
Erosion

Actual Annual Change in Cross-sectional Area ($m^2$)

MU boundary

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU 5c - Topographic Difference Model (2005-2008)

SCOPAC - Dorset

Change in Elevation (m) between Jan 2005 and Jan 2008

ACCRETION No Change EROSION

Model Extent

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU 5c - Beach Nourishment and Extraction Events (2008 - 2003)

SCOPAC - Dorset

Change in Elevation (m) between Sept 2003 and June 2008

ACCUREMENT No Change EROSION

Nourishment Site 2008
Extraction Site 2008
Nourishment Site 2007
Extraction Site 2007
Nourishment Site 2006
Extraction Site 2006
Nourishment Site 2005
Extraction Site 2005
Nourishment Site 2004
Extraction Site 2004

(2005 Aerial Photography)
Sediment Type
- Gravel
- Gravel & Sand
- Sand
- Boulders
- Dune
- Grass
- Gravel & Mud
- Mud
- Mud & Sand
- Rock
- Saltmarsh
- Sea Defence
- Shell
- Water body
- Mixture
- Obstruction
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU5b - Mean High Water Position

±

E

0 100 200

MHW Position

0.82m OD

Jan 2005

Jan 2008

SCOPAC - Dorset

MHW Position

0.82m OD

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

CPU 5a - Beach Change

SCOPAC - Dorset

Annual % Change in Cross-sectional Area (Spring 2007 to Spring 2008)

- > 30%
- 15 - 30%
- 5 - 15%
- Less than 5%
- 5 - 15%
- 15 - 30%
- > 30%

MU boundary

Actual Annual Change in Cross-sectional Area (m²)

(2005 Aerial Photography)
% Change in Cross-sectional Area (Baseline 2003 to Spring 2008)

- No Change
- Less than 5%
- 5 - 15%
- 15 - 30%
- > 30%

MU boundary

Actual Annual Change in Cross-sectional Area (m²)
CPU 5a - Topographic Difference Model (2005 - 2008)

SCOPAC - Dorset

Southeast Strategic Regional Coastal Monitoring Programme

Annual Report 2008

Change in Elevation (m) between Jan 2005 and Jan 2008

Model Extent

(2005 Aerial Photography)
Southeast Strategic Regional Coastal Monitoring Programme

CPU5a - Mean High Water Position

SCOPAC - Dorset

Annual Report 2008

0 100 200 m

MHW Position
0.82m OD

Jan 2005
Jan 2008

(2005 Aerial Photography)
Baseline Survey, 2007

Elevation (metres OD)

(2005 Aerial Photography)
Baseline Survey, 2007

Elevation (metres OD)

(2005 Aerial Photography)
Baseline Survey, 2006

Elevation (metres OD)

(2005 Aerial Photography)
EXPLANATORY NOTES

Change in Cross-sectional Area (CSA)

The annual change in cross-sectional area is calculated as the difference in CSA between two surveys, expressed as a percentage change compared to the earlier CSA.

\[
\frac{CSA_1 - CSA_2}{CSA_2} \times 100 \quad \text{Eqn (1)}
\]

where \(CSA_1\) = most recent springtime survey and \(CSA_2\) = spring survey previous year. Therefore an annual change of \(-14\%\) represents erosion during the last year of \(14\%\) of the area of last year’s survey.

Net Sediment Calculation

The value derived from this calculation represents the volume change in m\(^3\) across each individual management unit over time. The initial volumes are derived from the Digital Terrain Models made for consecutive baseline topographic surveys. Both models are clipped to cover the same area, then a volume above the MLWS plane is calculated for each DTM. The net sediment change is calculated as

\[
Vol_1 - Vol_2 \quad \text{Eqn (2)}
\]

where \(Vol_1\) = most recent DTM model volume and \(Vol_2\) = earlier DTM model volume. Therefore a net change of \(-19730m^3\) represents erosion since the earlier survey.
Cross Sectional Area above MP Trend for Location: 5g00119 [Wor31] and Reference Profile Set 2

Area Above MP Trend: Accreting at 3.763 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00126 [Wor24] and Reference Profile Set 2

Area Above MP Trend: Accreting at 1.270 m²/Year

Survey Date


Beach Area (m²)

Area Above MP
Area Trend
Recycling Event
Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00133 [Wor17] and Reference Profile Set 2

Area Above MP Trend: Eroding at -2.189 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00138 [Wor12] and Reference Profile Set 2

Area Above MP Trend: Eroding at -4.561 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00140 [Wor10] and Reference Profile Set 2

Area Above MP Trend: Eroding at -0.730 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00167 [LC8] and Reference Profile Set

Area Above MP Trend: Eroding at -0.300 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00172 [LC3] and Reference Profile Set

Area Above MP Trend: Eroding at -0.509 m²/Year

Survey Date:

- 22/02/2003
- 23/08/2003
- 21/02/2004
- 19/02/2004
- 19/02/2005
- 18/02/2006
- 17/02/2007
- 16/02/2008

Legend:
- Yellow: Recycling Event
- Green: Area Above MP
- Green Line: Area Trend
- Blue: Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00179 [MOW19] and Reference Profile Set

Area Above MP Trend: Accreting at 0.720 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00187 [MOW11] and Reference Profile Set

Area Above MP Trend: Eroding at -0.371 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00194 [MOW4] and Reference Profile Set

Area Above MP Trend: Eroding at -0.971 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00204 [DD14] and Reference Profile Set

Area Above MP Trend: Eroding at -0.157 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00214 [DD4] and Reference Profile Set

Area Above MP Trend: Eroding at -6.190 m2/Year

Survey Date

Beach Area (m²)

Recycling Event
Area Above MP
Area Trend
Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00244 [RB18] and Reference Profile Set

Area Above MP Trend: Accreting at 5.717 m²/Year

Survey Date


Beach Area (m²)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165

Recycling Event
Area Above MP
Area Trend
Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00261 [RB1] and Reference Profile Set

Area Above MP Trend: Eroding at -7.188 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00262A and Reference Profile Set

Area Above MP Trend: Accreting at 1.392 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00263 and Reference Profile Set

Area Above MP Trend: Accreting at 3.060 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00264 and Reference Profile Set

Area Above MP Trend: Eroding at -0.020 m²/Year

Survey Date
Cross Sectional Area above MP Trend for Location: 5g00290 [12400] and Reference Profile Set

Area Above MP Trend: Accreting at 4.609 m²/Year

Survey Date:
- 22/02/2003
- 23/08/2003
- 21/02/2004
- 21/08/2004
- 19/02/2005
- 20/08/2005
- 18/02/2006
- 19/08/2006
- 17/02/2007
- 18/08/2007
- 16/02/2008

Beach Area (m²):
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5
- 0
- -5
- -10
- -15
- -20
- -25
- -30
- -35

Legend:
- Yellow: Recycling Event
- Green: Area Above MP
- Green: Area Trend
- Blue: Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00292 [12200] and Reference Profile Set

Area Above MP Trend: Accreting at 3.950 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00294 [12000] and Reference Profile Set

Area Above MP Trend: Accreting at 3.243 m²/Year

Survey Date


Beach Area (m²)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

-0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

Recycling Event
Area Above MP
Area Trend
Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00298 [11600] and Reference Profile Set

Area Above MP Trend: Eroding at -0.252 m^2/Year

Survey Date


Beach Area (m^2)
Cross Sectional Area above MP Trend for Location: 5g00300 (11400) and Reference Profile Set

Area Above MP Trend: Eroding at -1.163 m²/Year

Survey Date:

Legend:
- Yellow: Recycling Event
- Green: Area Above MP
- Green: Area Trend
- Blue: Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00302 [11200] and Reference Profile Set

Area Above MP Trend: Eroding at -0.164 m²/Year
Cross sectional area above MP trend for Location: 5g00304 [11000] and Reference Profile Set

Area above MP trend: Eroding at -0.252 m²/year

Survey Date:
- 22/02/2003
- 23/08/2003
- 21/02/2004
- 21/08/2004
- 19/02/2005
- 20/08/2005
- 18/02/2006
- 19/08/2006
- 17/02/2007
- 18/08/2007
- 16/02/2008
Cross Sectional Area above MP Trend for Location: 5g00306 [10800] and Reference Profile Set

Area Above MP Trend: Eroding at -1.215 m²/Year

Survey Date

- Recycling Event
- Area Above MP
- Area Trend
- Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00308 [10600] and Reference Profile Set

Area Above MP Trend: Accreting at 0.778 m²/Year

Survey Date:

Legend:
- Yellow: Recycling Event
- Green: Area Above MP
- Green: Area Trend
- Blue: Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00310 [10400] and Reference Profile Set

Area Above MP Trend: Accreting at 0.001 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00312 [10200] and Reference Profile Set

Area Above MP Trend: Accreting at 2.098 m²/Year

Survey Date

Beach Area (m²)


Recycling Event
Area Above MP
Area Trend
Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00316 [9800] and Reference Profile Set

Area Above MP Trend: Eroding at -0.518 m²/Year

Survey Date


Beach Area (m²)

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
Cross Sectional Area above MP Trend for Location: 5g00318 [9600] and Reference Profile Set

Area Above MP Trend: Eroding at -0.483 m²/Year

Survey Date:
- 22/02/2003
- 23/08/2003
- 21/02/2004
- 21/08/2004
- 19/02/2005
- 20/08/2005
- 18/02/2006
- 19/02/2006
- 17/02/2007
- 18/02/2007
- 16/02/2008

Legend:
- Yellow: Recycling Event
- Green: Area Above MP
- Green: Area Trend
- Blue: Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00322 [9200] and Reference Profile Set

Area Above MP Trend: Accreting at 0.665 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00324 [9000] and Reference Profile Set

Area Above MP Trend: Accreting at 0.933 m²/Year

Survey Date


Beach Area (m²)

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

Recycling Event Area Above MP Area Trend Area Between MP & DP
Cross Sectional Area above MP Trend for Location: 5g00326 [9800] and Reference Profile Set

Area Above MP Trend: Accreting at 4.610 m²/Year
Cross Sectional Area above MP Trend for Location: 5g00328 [8600] and Reference Profile Set

Area Above MP Trend: Accreting at 1.056 m²/Year

Survey Date


Beach Area (m²)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150

Recycling Event | Area Above MP | Area Trend | Area Between MP & DP